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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/523,517

02/04/2005

Taro Kamiko

2004 LW 2488 US

1666

48154

7590

05/06/2008

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EXAMINER

ALSIP, MICHAEL

ART UNIT

PAPER NUMBER

2186

MAIL DATE

DELIVERY MODE

05/06/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/523,517	<b>Applicant(s)</b> KAMIKO ET AL.	
	<b>Examiner</b> MICHAEL ALSIP	<b>Art Unit</b> 2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1, 3-6, 8, 9, 11-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrel et al. (US 5,829,038), and further in view of Brabandt (US 5,809,531).

1. Consider **claim 1**, Merrel et al. discloses a data processing system having: at least one processor chip including a processor unit and an internal data cache (Col. 2 lines 59-65), and an interface **external to the internal data cache and** which is configured to receive **cache mirror** data from the processor chip (where the L2-Ln part of the cache hierarchy interfaces the main memory with the CPU and L1 cache(data cache) and receives data to be written from the processor chip, the claim language

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does not require that the interface be external to the processor chip, but instead that it is external to the data cache and therefore the L2-Ln part of the cache hierarchy is considered the interface between the processor and data cache combination and the external memory), the interface further configured to discard all the **cache mirror** data to be written to an external memory received from the processor chip **so that cache mirror data is never written** to the external memory **during operation of the processor chip** (Col. 3 lines 46-67 and Col. 4 lines 1-37 where data written back to the cache hierarchy will eventually become a victim line and be evicted (discarded) and if the data line is clean it will be discarded and not written to the external memory), but Merrel does not teach that all the cache mirror data to be written to an external memory received from the processor chip is **never** written, however Brabandt discloses the ability to have a system where no external memory is needed and therefore no writes to that external memory will ever be needed and therefore never written, even during a flush or eviction (abstract, Col. 1 lines 33-35 and 45-48, Col. 2 lines 1-4 and 32-35 and Col. 4 lines 18-35, the examiner would also like to point out that if there is no data to be written back, as in Brabandt, then there is no data to discard).

It would have been obvious to one of ordinary skill in the art at the time the invention was to combine the teachings of Brabandt with Merrel, because Brabandt teaches that the ability to remove the need to rely on an external memory and therefore never write data to an external memory increases the overall performance of the microprocessor itself (Col. 1 lines 22-26).

2. Consider **claim 3**, as applied to **claim 1** above, Merrel et al. discloses a data processing system according to **claim 1** further including one or more further processing chips which have read/write access to external memory (Col. 2 lines 16-17, Col. 5 lines 22-26).

3. Consider **claim 4**, Merrel et al. discloses a method of operating a processing chip having a processor, an internal data cache and a cache controller for transmitting **cache mirror data** write instructions out of the **processor chip** (Col. 2 lines 60-65, Col. 3 lines 25-34), the method including discarding the write instructions **so that cache mirror data is never written** to an external memory **during the operation of the processing chip** (Col. 3 lines 46-67 and Col. 4 lines 1-37, where the write back instructions are canceled (discarded) if in the cache hierarchy there exists associated cache line in a lower level cache is clean) and arranging for the program code operated by the processor to require only the data cache as memory (The purpose of the cache and control of the cache (replacement policy) is to reduce the amount of times the processor needs to access slower memory to retrieve its desired data by keeping as much of the require program data as possible in the cache, therefore if the program being run is only as big as the cache the program will use only the cache as its memory) , but Merrel does not teach that all the cache mirror data to be written to an external memory received from the processor chip is **never** written, however Brabandt discloses the ability to have a system where no external memory is needed and therefore no writes to that external memory will ever be needed and therefore never written, even during a flush or eviction (abstract, Col. 1 lines 33-35 and 45-48, Col. 2 lines 1-4 and 32-35 and

Col. 4 lines 18-35, the examiner would also like to point out that if there is no data to be written back, as in Brabandt, then there is no data to discard).

It would have been obvious to one of ordinary skill in the art at the time the invention was to combine the teachings of Brabandt with Merrel, because Brabandt teaches that the ability to remove the need to rely on an external memory and therefore never write data to an external memory increases the overall performance of the microprocessor itself (Col. 1 lines 22-26).

4. Consider **claim 5**, as applied to **claim 1** above, Merrel et al. discloses a data processing system according to **claim 1**, wherein the at least one processor chip comprises exactly one processor chip (Fig. 1).

5. Consider **claim 6**, as applied to **claim 1** above, Merrel et al. discloses a data processing system according to **claim 1**, wherein the at least one processor chip comprises two processor chips (Col. 2 lines 16-17, Col. 5 lines 22-26).

6. Consider **claim 8**, Merrel et al. discloses a data processing system comprising: a processor chip including an internal processor coupled to an internal data cache (Col. 2 lines 59-65); an external memory (Fig. 1); and an interface **external to the internal data cache** coupled between the processor chip and the external memory, the interface configured to receive memory data from the external memory and transfer the memory data to the processor chip (where the L2-Ln part of the cache hierarchy interfaces the main memory with the CPU and L1 cache(data cache) and receives data to be written from the processor chip, the claim language does not require that the interface be external to the processor chip, but instead that it is external to the data cache and

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therefore the L2-Ln part of the cache hierarchy is considered the interface between the processor and data cache combination and the external memory), the interface further configured to receive **internal cache mirror** data from the processor chip and discard all the **internal cache mirror** data to be written to the external memory **so that** the **internal cache mirror** data **is never written** to an external memory (Col. 3 lines 46-67 and Col. 4 lines 1-37 where data written back to the cache hierarchy will eventually become a victim line and be evicted (discarded) and if the data line is clean it will be discarded and not written to the external memory), but Merrel does not teach that all the cache mirror data to be written to an external memory received from the processor chip is **never** written, however Brabandt discloses the ability to have a system where no external memory is needed and therefore no writes to that external memory will ever be needed and therefore never written, even during a flush or eviction (abstract, Col. 1 lines 33-35 and 45-48, Col. 2 lines 1-4 and 32-35 and Col. 4 lines 18-35, the examiner would also like to point out that if there is no data to be written back, as in Brabandt, then there is no data to discard).

It would have been obvious to one of ordinary skill in the art at the time the invention was to combine the teachings of Brabandt with Merrel, because Brabandt teaches that the ability to remove the need to rely on an external memory and therefore never write data to an external memory increases the overall performance of the microprocessor itself (Col. 1 lines 22-26).

7. Consider **claim 9**, as applied to **claim 8** above, Merrel et al. discloses a data processing system according to **claim 8**, further comprising a control circuit coupled to

the interface circuit, the control circuit providing a control signal to indicate whether data received by the interface should be discarded (the cache controllers for each cache in the hierarchy are the control circuits which contain the algorithms for determining which data is moved in and out of cache (cache replacement policy), including the eviction (discarding) of data in the cache).

8. Consider **claim 11**, as applied to **claim 8** above, Merrel et al. discloses a data processing system according to **claim 8**, further comprising: a second processor chip that includes an internal processor coupled to an internal cache; and a second interface, wherein the second processor chip is coupled to the external memory through the second interface (Fig. 1, Col. 2 lines 16-17, Col. 5 lines 22-26, where each processor in the multi-processor cluster will have the same configuration as in fig. 1).

9. Consider **claim 12**, as applied to **claim 11** above, Merrel et al. discloses a data processing system according to **claim 11**, further comprising a system bus coupled to the processor chip, the second processor chip, the interface, and the second interface (Fig. 1, Col. 2 lines 16-17, Col. 3 lines 24-34, Col. 5 lines 22-26, wherein in a cluster the databus will be used in the same fashion as per the embodiment described).

10. Consider **claim 13**, as applied to **claim 12** above, Merrel et al. discloses a data processing system according to **claim 12**, further comprising a third processor chip coupled to the system bus (Fig. 1, Col. 2 lines 16-17, Col. 5 lines 22-26).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:



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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Merrel et al. (US 5,829,038) in view of Brabandt (US 5,809,531) as applied to **claim 1** above, and further in view of Klein (6,401,199 B1).

14. Consider **claim 2**, as applied to **claim 1** above, Merrel et al. in view of Brabandt discloses a data processing system according to **claim 1** in which the interface is coupled to a memory (Merrel et al: Col. 2 lines 59-65), but Merrel does not explicitly state that the interface passing data to the processor chip during initialization, whereas Klein does teach this (Klein: abstract Col. 1 lines 22-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have the processor chip initialize through the cache hierarchy interface of Merrel, because Klein teaches that running the bootstrap programs from RAM instead of ROM is faster and also the use of ROM to hold initialization data at start-up is well-known because the data is not lost when the system is shutdown (Klein: Col. 1 lines 22-63).

15. **Claims 7, 10 and 16-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrel et al. (US 5,829,038) in view of Brabandt (US 5,809,531) as applied to **claims 1 and 9** above, and further in view of The Cache Memory book by Him Handy (Handy).

16. Consider **claims 7**, as applied to **claim 1** above, Merrel et al. in view of Brabandt discloses a data processing system according to **claim 1**, but does not explicitly disclose wherein the processor chip further includes an internal cache controller coupled between the internal data cache and the processor unit whereas Handy does teach this feature (Handy: Fig. 2.4 pages 42-49, all CPU/cache interactions are controlled by the cache controller which must intercept all of the CPU's signals).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have the cache controller between the internal data cache and processor unit in the system of Merrel et al., because Handy teaches that all CPU/cache interactions are controlled by the cache controller which must intercept all of the CPU's signals, therefore it would be obvious for the cache controller to be between the internal data cache and processor unit (Handy: Fig. 2.4 pages 42-49).

17. Consider **claim 10**, as applied to **claim 9** above, Merrel et al. in view of Brabandt discloses a data processing system according to **claim 9**, but does not explicitly state wherein the control circuit comprises a decoder (Handy: Fig. 5.5, pages 196-197).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have a decoder in the control circuit in the system of Merrel et al., because

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Handy teaches that using a decoder with the control circuit for the cache reduces delays in determining cache hits and misses (page 196-197).

18. Consider **claim 16**, Merrel et al. discloses a method of operating a data processing system having a plurality of integrated circuits, each integrated circuit having a processor, an internal data cache, and a cache controller (Col. 2 lines 16-17 and 60-65, Col. 3 lines 25-34, Col. 5 lines 22-26), the method comprising: transmitting cache mirror data write instructions from a first cache controller of a first integrated circuit to an external memory interface (Fig. 1, where the L2-Ln part of the cache hierarchy interfaces the main memory with the CPU and L1 cache(data cache) and receives data to be written from the processor chip, the cache hierarchy is considered the interface between the processor and data cache combination and the external memory); and discarding the first cache mirror data write instructions at the external memory interface so that cache mirror data is never written to external memory during operation of the first processor (Col. 3 lines 46-67 and Col. 4 lines 1-37 where data written back to the cache hierarchy will eventually become a victim line and be evicted (discarded) and if the data line is clean it will be discarded and not written to the external memory), but Merrel does not teach that all the cache mirror data to be written to an external memory received from the processor chip is never written, however Brabandt discloses the ability to have a system where no external memory is needed and therefore no writes to that external memory will ever be needed and therefore never written, even during a flush or eviction (abstract, Col. 1 lines 33-35 and 45-48, Col. 2 lines 1-4 and 32-35 and

Col. 4 lines 18-35, the examiner would also like to point out that if there is no data to be written back, as in Brabandt, then there is no data to discard).

It would have been obvious to one of ordinary skill in the art at the time the invention was to combine the teachings of Brabandt with Merrel, because Brabandt teaches that the ability to remove the need to rely on an external memory and therefore never write data to an external memory increases the overall performance of the microprocessor itself (Col. 1 lines 22-26).

The combination of Merrel in view of Brabandt does not explicitly disclose wherein the external memory interface is located outside the first integrated circuit. The examiner is considering the L2-Ln caches to be the interface, however in Merrel these caches happen to be integrated into the chip, however Handy (pg. 28 ¶s 2 and 3 and table 1.1 and pg. 89-90 section 2.2.10) discloses that external caches are used in both systems that do and do not have an on-chip cache, the benefits of having additional caches being external rather than internal are reduced costs, reduced die size, and the ability to make up for some of the deficiencies of the on-chip cache, therefore being obvious to one of ordinary skill in the art.

19. Consider **claim 17**, as applied to **claim 16** above, Merrel et al. in view of Brabandt and Handy disclose further comprising: transmitting second cache mirror data write instructions from a second cache controller in a second integrated circuit to the external memory interface; writing the second cache mirror data write instructions from the external memory interface to external memory (Merrel et al.: Col. 2 lines 16-17, Col. 5 lines 22-26 and Handy pg. 140 ¶ 2, where Merrel discloses a multiprocessor system

and Handy discloses the ability to share the lower level caches (interface) with multiple processors and Merrel discloses the ability to write data to the external memory).

Consider **claim 18**, as applied to **claim 17** above, Merrel et al. in view of Brabandt and Handy disclose further comprising: determining if a task requires a read/write memory that is larger than an internal data cache size; and allocating the task to the first integrated circuit or to the second integrated circuit based upon the determining step (Brabandt abstract, the examiner considers the term “task” to only be a single instruction and the act of loading an instruction into a cache line means that it has been determined that the instruction does not need a larger memory and the act of loading also means that a circuit in the system has been allocated).

20. **Claims 14 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrel et al. (US 5,829,038) in view of Brabandt (US 5,809,531) as applied to **claim 13** above, and further in view of Stewart et al. (US 5,157,780).

21. Consider **claim 14**, as applied to **claim 13** above, Merrel et al. in view of Brabandt discloses a data processing system according to **claim 13**, but does not explicitly state the system of claim 13 wherein the third processor chip comprises a master processing unit and wherein the processor chip and the second processor chip comprise slave processing units, whereas Stewart et al. does teach this feature (Fig. 1, Col. 1 lines 13-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have a plurality of processors implemented in a master/slave configuration

in the system of Merrel et al., because Stewart et al. teaches that it is common to use redundant processors to provide a fail-safe mode of operation (Col. 1 lines 13-18).

22. Consider **claim 15**, as applied to **claim 14** above, Merrel et al. discloses a data processing system according to **claim 14**, further comprising a second external memory directly coupled to the system bus. (The examiner is taking official notice to the fact that it is well-known and common in the art that computer systems have a type of ROM connected to the system bus for BIOS or initialization of the system upon start-up).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have a second external memory coupled to the system bus in the system of Merrel et al., because it is notoriously well-known and common in the art to have ROM connected to the system bus to initialize a processing system upon start-up.

### ***Response to Arguments***

23. Applicant's arguments with respect to **claims 1-18** have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL ALSIP whose telephone number is (571)270-1182. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matt Kim/  
Supervisory Patent Examiner, Art Unit 2186

Michael Alsip  
Examiner  
Art Unit 2186

/Michael Alsip/  
Examiner, Art Unit 2186

April 28, 2008